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Is Naval Information Warfare Center (NWIC) Pacific Building and Effective Organizational Knowledge Management Structure?

September 2022

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ABSTRACT

This paper will draw upon program management principles such as requirements collection/management and successful KM to assess whether NIWC PAC's approach will meet the evolving organizational needs of a highly specialized environment. The analysis will also attempt to answer the question of whether NIWC PAC is trending in a positive direction to establish a comprehensive and scalable KM framework to allow for streamlined processes, data collection, and rigor to ensure the sharing of relevant content. NIWC PAC is a diverse organization with an array of partners and customers. The organization itself is compartmentalized into departments, each specializing in its own area of practice with methods of conducting business unique to their customer base in support of the Navy's C4ISR mission.

The challenge at NIWC PAC is to capture, maintain, and share organizational knowledge and information, some of which include the lack of a refined search functionality, inadvertently creating stove-piped environments, not identifying a centralized repository for business-related products, establishing disparate platforms to share duplicative information, and a lack of rigor to ensure information is accessible to the appropriate audience. Adding to the issues was the workforce's reluctance to change after previous efforts repeatedly introduced various Content Management Systems (CMS) that forced users to relearn how to use new platforms, which left them fatigued, confused, and skeptical.

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LIST OF ACRONYMS AND ABBREVIATIONS.

BP	Best Practice
C4ISR	Command, Control, Communications, Computers, Surveillance and Reconnaissance
CCB	Configuration Control Board
CM	Configuration Management
CMMI	Capability Maturity Model Integrated
CMS	Content Management System
CoP	Community of Practice
CORs	Contracting Officer's Representatives
CPI-CCB	Continuous Process Improvement-Change Control Board
CSWF	Cybersecurity Workforce
ECM	Enterprise Content Management
IPT	Integrated Product Team
ISSO	Information System Security Officers
JSM	JIRA Service Management
KBCM	Knowledge Based Content Management
KM	Knowledge Management
MR	Master Roster
NAVWAR HQ	Naval Information Warfare Systems Command
NIWC LANT	Naval Information Warfare Center Atlantic
NIWC PAC	Naval Information Warfare Center Pacific
NSERC	Naval Systems Engineering Resource Center
OPD	Organizational Process Definition
OSSP	Organizational Set of Standard Processes
PAA	Privileged Access Agreement
PAL	Process Asset Library
PML	Process Management Life cycle

POR	Program of Record
ROC	Research, Development, Testing & Evaluation Operations Center
SA	Specialty Areas
SAAR	System Authorization Access Request
SPAA	Standard Process Assets Architecture

EXECUTIVE SUMMARY

The focus of this research is to assess the development of Naval Information Warfare Center (NIWC) Pacific's approach to establishing a knowledge management (KM) infrastructure by way of effective program management (PM) practices. The primary focus of the assessment is NIWC Pacific's requirements collection and management along with its process management approach as it developed a comprehensive and scalable KM framework. The researcher compares this effort to various professional and scholastic research that have synthesized and laid the foundation of what to look for in a cohesive KM framework. The researcher also dives into NIWC Pacific's methodology and previous attempts to disseminate content by use of various platforms as well in conjunction with contrasting it to its current state to study the qualitative and quantitative attributes used to assess the proficiency in which information is distributed and used.

This comparative approach will illustrate the inefficiencies created by loosely managed, configured, and duplicative platforms leveraged by the command's user community prior to its current state. The lack of rigor in prior efforts to share information was ineffective as outdated material propagated across the command and increased the skepticism of many in leadership whether business areas or projects leveraged the most current information. Another factor for review is how rationalizing systems into a congruent set of platforms to meet the requirements set forth by NIWC Pacific's leadership and internal customers improved the curation of content and business data as well.

Platform data collection proved to be a functionality that was missing, or not easily accessible to users and senior leaders. Compared to its current framework, it was cumbersome to collect user traffic and content information to establish a baseline of how to curate products and content in conjunction with the vetting process of updating or adding/removing content. This research will also illustrate the business rules and practices developed that ensure relevant knowledge and information is purposefully made available to the workforce. The results shed light on the enforcement mechanisms in place by way of Change Configuration Boards (CCBs) to manage the proliferation of business products in addition to systems in which they operate.

NIWC Pacific has garnered an internal reputation of deploying content management systems (CMS) in a confusing manner as well. Not only in the decision making that led to the platforms chosen, but also in the timeframe and methodology in which they were deployed. End users were frustrated and eventually fatigue at the rapid rate platforms were introduced and replaced—in many cases with little warning or preparation. This research will share insight why this works against the effectiveness of a sound KM practice.

Another important facet to the transformation of NIWC Pacific's s curating of information was senior leadership buy-in. There were various approaches to proliferating information at the command. Designated teams were given the go-ahead to use and administer approved COTS platforms as content management systems. Unfortunately, there was an unintended consequence by giving system administrators complete carte blanche. There was a laissez faire mentality by various system administrators and content managers across the varying platforms, which made curating and managing information difficult. This also fostered an environment that did not incorporate robust access controls.

This analysis will touch upon the pivotal decision made by NIWC Pacific's senior leadership to rationalize its systems and champion the requirements collection to effectively create a viable KM framework. This research recommends that NIWC Pacific continue to follow its internal and organic approach to sustaining a KM framework because my assessment has shown its approach not only caters to the Center's unique needs, but is also built upon sound program and knowledge management principles.

I.   INTRODUCTION

This chapter provides a background to the early stages to the evolution of knowledge management (KM) at Naval Information Warfare Center (NIWC) Pacific around my arrival at the command in 2010. It will also touch on the various issues that plagued the Center before a KM methodology was finally solidified as it aimed to ensure a cohesive method of information collection, organization, distribution, and processing of key corporate information (in all its types). These efforts are still maturing to this day. A background of historical context will be provided to articulate the extent of the problem the Center faced when it practiced a siloed and inefficient approach to the collection, and dissemination of information.

A.   BACKGROUND

1.   NIWC Pacific and Center Information

In 2010, NIWC Pacific was engaged in an endeavor to change the culture of how organizational information was identified. To establish a methodology to apply rigor-intensive holistic approach to apply changes to identified material and share it for use. The Center was organized into a competency-based structure (now a department based one):

- Finance (1.0)
- Contracts (2.0)
- Office of Counsel (3.0)
- Logistics (4.0)

- Engineering (5.0)
- Program & Project Management (6.0)
- Cyber S&T (7.0)
- Corporate Operations (8.0)

Each of these areas above developed their own business rules and methodologies in which to collaborate and share configuration items (CIs) such as (but not limited to) templates, forms, checklists, processes and procedures, data and specification sheets, memorandums, and various other types of documents related to their field of expertise. Every one of these areas and sub-units therein developed a culture of retaining tight control of their information and shared very little with one another with the exception of when formal requests such as data calls, form submittals and the like to produce the information

needed. At best, the information produced was already stale due to the lack of dynamic capabilities to share real-time information. The workforce also became accustomed to working in siloes and relied heavily on tribal knowledge, meaning that there were little to no documented procedures on how to perform specific tasks—so the workforce relied heavily on each other for knowledge, which is known as tacit knowledge. Tenured individuals would be identified as subject matter experts that would informally distribute knowledge or procedural information (Bencsik & Filep, p. 533).

This type of knowledge is heavily reliant on personal and trusted relationships, which is a heavy driver of work culture. It was the lack of a proper KM structure that made management of authoritative documents a challenge as individuals with tribal knowledge tended to share their latest version of the form without full knowledge of whether it was current or had been updated. Thus, the Center's disorganized and decentralized KM structure of 2010 encouraged a culture of tribal knowledge sharing and uncertainty over the validity of authoritative information.

The lack of mechanisms in place to communicate new changes applied to an array of items (aside from e-mail), made it particularly taxing for the workforce to keep up with the updates applied to items used by the workforce. Granted there were early efforts by certain visionaries at the Center with the wherewithal to serve as the change managers of products leveraged by their particular branches. Unfortunately, there was no singular apparatus in play to signify to the rest of the command of revisions or releases besides the standard correspondence sent out or meeting announcements which typically only resonated with little effect. To counter this effect, tribal knowledge was often the point of correction to offer a semblance of structure. As a result, frustration set in on a many different levels; from the managers in the mindset that the workforce was not listening to them, to the Center employees expressing the lack of communication filtered to them from leadership. Replication of efforts and duplication of material did not assist matters either.

2.   Multiplicity of KM Platforms

Despite being at the forefront of the Department of the Navy (DON) footprint in information technology (IT) solutions and support, NIWC Pacific does not have carte

blanche in selecting or implementing platforms or environments for use. Strict cybersecurity, IT framework, and risk management parameters as established by instructions and direction (e.g., Department of Defense Instruction 8500.01 and Department of Defense Information Technology Portfolio Repository–Department of the Navy Guidance) constrain the Command with regards to what information or management systems can be acquired and deployed for use in comparison to the commercial/private industry. NIWC Pacific's platforms for use were immediately scoped and the initial KM group acquired a series of approved platforms for command use. The mantra of this group of system administrators is to let the user community leverage these platforms in a heavily decentralized manner to allow the user base to proliferate data and content as they saw fit. These content management systems (CMS) were used in various ways that allowed for the mixing of user generated and authoritative information. This "wild west" environment made it hard for users to find relevant, up-to-date authoritative information. One of the resources used to display all of the items in these CMS' was a Google Search Appliance that displayed the search results of a singular file from all of the platforms. The result(s) displayed were all similar, if not duplicate, items stored across the various systems.

The almost nonexistent cohesiveness among the user base perpetuated content creation and sharing in an uncontrollable manner. A framework was not present and it made curating information across the platforms difficult if not apparent at all. Bloated CMS' with repetitive, and outdated, information presented users with a data mining headache when trying to find and leverage business artifacts and information. Content management, in practice, became a passive effort; meaning that material would be created then shared with little oversight to perform validation to ensure that the user community was in fact absorbing and using the most relevant pieces of information. These iterations included the deployment of various systems for content sharing such as MovableType, early instantiations of Confluence Wiki, and eventually a component of the Naval Systems Engineering Resource Center (NSERC).

MovableType and Confluence Wiki were very similar in form that locations, or site spaces, were very easily created by anyone. When coupling that with no content sharing framework, it soon became a virtual version of the wild west. There was no distinction

between collaborative and authoritative content as departments would use both to share vast amounts of information; and more often times than not, it would be duplicative in nature. In effort to make a course correction, NIWC Pacific leveraged the services of NSERC by establishing its own command-specific site collection through their services. One of the many issues with this approach was that NIWC Pacific did not own the site collection so the scalability of the solution was severely hampered. Ad-hoc or immediate remediation to address workflow processing issues were not immediate nor was the visualization of statistics to calculate processing times of internal requests easily attainable. As a result of that, and NSERCs pricing schema for user accounts and support, it became apparent to the command that there was a need to research other ways of managing the growing KM needs.

This departure from NSERC set the stage of the establishment of the Hub—a KM approach built upon a suite of collaboration tools offered through Atlassian. The Hub has gone through various iterations, which focused on maximizing the user experience when searching for content/products. Part of these improvements was creating a common look and feel across the platform. As mentioned before, material existed across multiple areas, with the inclusion of a Wiki environment, known as NAVWAR Wiki where the first instance of the Hub once resided. NAVWAR Wiki is a shared collaboration environment between NAVWAR Headquarters (NAVWAR HQ), NIWC Atlantic and NIWC Pacific. There was no common theme to this environment other than it was used to host an array of information and all three commands shared one search box which made search results rather difficult to mine through.

The first version of the Hub attempted to remedy the confusion for NIWC Pacific employees by creating a location for NIWC Pacific-centric information. Unfortunately, since the NAVWAR Wiki was a shared environment, the search capabilities only went so far to comb through NAVWAR and NIWC Atlantic content and information. In addition to that, the shared collaboration space was also a mixed use environment. Users we able to create their own spaces to socialize about non-work related matters as well. After deliberation with Corporate Operations leadership, the KM lead was given the go-ahead to

establish a completely separate Wiki Confluence environment outside of the shared one. This was a particularly pivotal for NIWC Pacific's organizational content sharing goals

3.   Knowledge and Process Management

Prior to the establishment of the KM initiative, NIWC Pacific set an effort to catalog and apply configuration management (CM) of center-wide assets used for day-to-day business practices. One of the most essential components in the process development was capturing the core requirements of a process. Prior to developing a process template various, if not all departments and branches, would loosely capture requirements, which left a lot open to interpretation.

The specificity in which process development abided to given the above requirements set forth an approach with high fidelity, which gave room to very little confusion of how processes were to operate moving forward. The explicit knowledge shared by subject matter experts (SMEs) and tenured workforce members were captured in a way that made it easy for anyone to familiarize themselves with the necessary knowledge to step into their roles at a faster rate in addition to identifying any key areas of improvement moving forward as business dictated.

In concert to with the above, the Knowledge and Process Management branch also had a role in establishing a repository to catalog and organize these configuration items (CIs) by way of its development and enforcement of the Organizational Process Definition (OPD). NIWC Pacific's OPD process and the outputs of this process has garnered significant products that are still in use to this day. One of the many products developed as a result of this process is the Process Asset Library (PAL). As stated in step 4 of the OPD process:

> Knowledge and Process Management maintains access-controlled Center-level PAL, making standard processes, plans, policies, training materials, reports, guidance, and other CPI-CCB-approved information available to our workforce…Knowledge and Process management also reviews and analyzes the PAL and its products for (1) satisfaction of documented inclusion criteria; and (2) adherence to the CPI-CCB process. (NIWC PAC OPD Process, 2021)

For over ten years the PAL has served as one of the command's channels of authoritative information. By employing the Capability Maturity Model Integration (CMMI) framework another schema known as the Organizational Set of Standard Processes (OSSP) that compartmentalized Center processes according to their area of function (i.e., Operations, Engineering, Requirements Management, Organizational Process Focus, and Contracting) was created which continues to mature as the requirement needs of the command evolve in conjunction with supporting the various Integrated Product Teams (IPTS), projects and various departments at the command.

In parallel with establishing the PAL, the Knowledge and Process Management branch (with leadership buy-in and support) worked with other departments across the command to establish a mechanism to manage and control NIWC Pacific CIs in the PAL by way of a governing body. Once stakeholders were identified, change processes were established, and the effort was chartered at the command level, that body would be known moving forward as the Continuous Process Improvement Configuration Control Board (CPI-CCB). To this day, it still serves as the governing body to vet, adjudicate, and apply changes to command-level assets as needed. It is co-chaired with voting members from the various departments across the command to ensure that a measured and holistic approach is applied to products when changes are implemented then communicated to their respective departments, or the rest of the command when needed. As a result of the CPI-CCB many processes and procedures were developed to ensure the maturity of continuous process improvement (and all of the related efforts across the command) followed specific guidance to ensure repeatability of standards within various life cycles (either at the process or project level) are retained.

The Knowledge and Process management branch later became heavily involved in what was to be first known as the KM initiative. It was at this stage that the command coupled an array of groups from across the Center to develop a method to better capture, share, and leverage the various types of information, whether it be departmental project/ task level. The KM initiative set NIWC Pacific to create a functional approach to automating processes and requests and visualize statistics to measure performance in efforts to isolate possible areas of improvement. These potential improvements areas would

offer justification to make the appropriate changes. The Knowledge and Process Management, alongside other IPTs and support groups, would be a crucial components to its process and knowledge maturity. Specifically, when consolidating the platforms of use across the command and focus efforts on already used resources which proved most useful and scalable, which are Atlassian's Confluence and JIRA Service Management (JSM) suite (also branded as Hub Services at NIWC Pacific). Confluence serves as the front visualization end of content and CI sharing, alongside communications with end-users, and JSM is the crucial component processing the various workflows and analytic representations of business processes across NIWC Pacific.

4.   Summary

The above introduction of NIWC Pacific's Process Management and KM branch's efforts provides a brief insight into the considerable amount of effort to standardize, apply change management rigor, then proliferate Center business assets. The KM team has automated service requests into succinct workflows to visually synthesize metrics to assess performance as well. All while still incorporating requirements collection and management efforts to further improve content and business practices. Figure 1 illustrates the cyclical relationship between requirements collection, process management, requirements management (RQM), and KM.
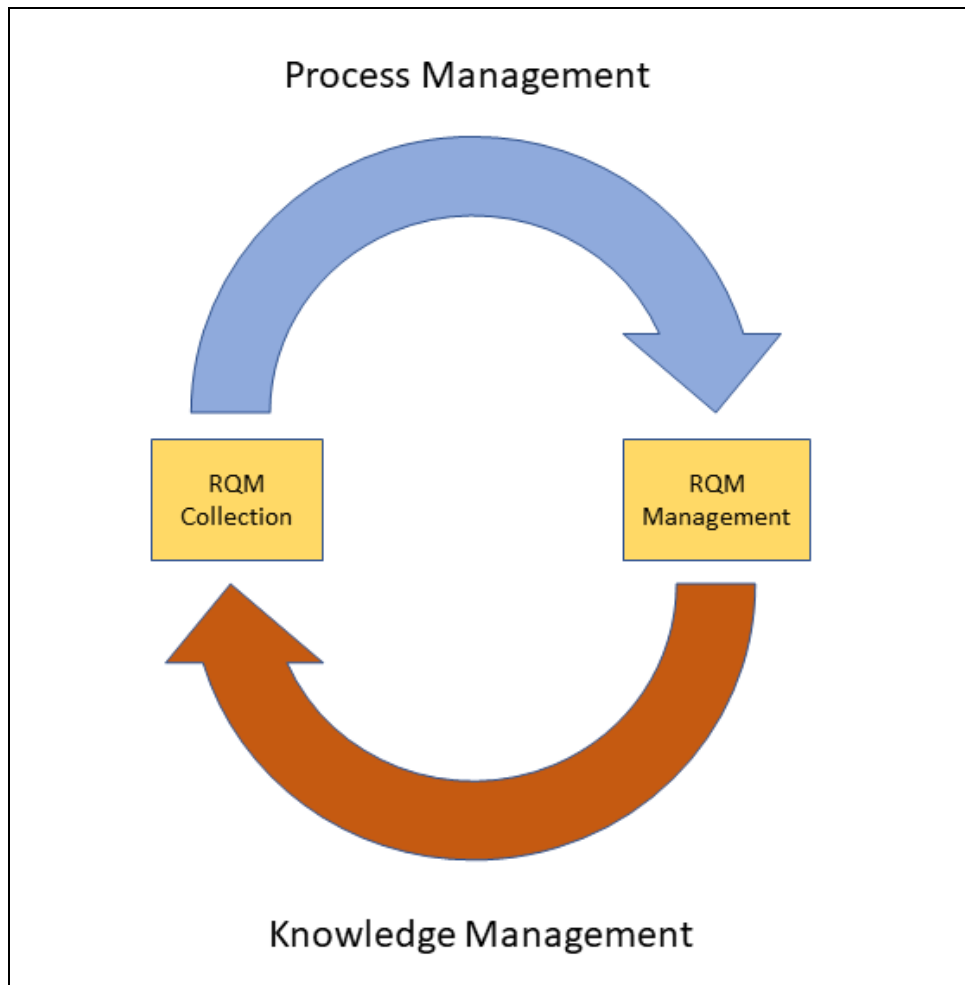
Figure 1.   Relationship Cycle between Process and Knowledge Management

Part and parcel to the success of business practices, regardless of their nature, is that they continue to evolve as the requirements change. This change can be triggered by feedback collected from the workforce or customers (internal or external). Capturing the initial set of requirements, in addition to minimizing the amount of scope creep, is only the initial step. By replicating the process template criteria covered earlier, it set forth the mechanisms to assert the necessary practices to facilitate and foster the management of previously established requirements and manage how workflows and business processes operated and how to apply, capture, and incorporate approved modifications moving forward as well.

B. PROBLEM STATEMENT

The basic tenet of KM is that the right knowledge needs to be made available to the right people at the right time for the purpose of taking concerted action (Rhoads, O'Sullivan, Stankosky, 2009).

The question remains whether NIWC Pacific has appropriately leveraged the current suite of technologies and process to handle the following:

- Appropriately proliferate business related content and CI's

- Gather evolving requirements to improve upon business processes

- Minimize duplicative information

- Create the appropriate tools to workflow business requests

- Visualize the statistics needed to remediate or improve upon any of the above when necessary.

The intent of this research is to assess the implemented methodologies NIWCPacific has enacted in comparison to documented theories of an effective KM approach and then be further refined whether practices therein are sufficient to meet the merits of an impactful KM framework.

C. RESEARCH OBJECTIVES

The premise of this research is to lay the foundation to determine whether or not NIWC Pacific is leveraging its resources—particularly as far as what feedback mechanisms are employed to gather additional requirements from the workforce, how dynamic information is being shared and used to better improve or retire assets being shared across the command, and among many other things assess user acceptance of the workflows and content shared to the command as whole.

D. RESEARCH QUESTIONS

Knowledge management (KM) is often questioned over its concept, intended purpose, user community, and practical application. The intent of this research is to offer about the value of KM with NIWC Pacific.

The primary research is driven by assessing NIWC Pacific's practice of its interpretation and application of requirements collection and management, process management, and KM.

Primary Research Question 1: What actions/practices has NIWC Pacific conducted to properly ensure that knowledge is managed and shared across the command?

Primary Research Question 2: Has NIWC Pacific proficiently used the platform set before them to conduct their business?

E. SCOPE/METHODOLOGY

This research will compare NIWC Pacific's overall method of approach to managing knowledge to Nonaka's SECI (Socialization, Externalization, Combination, Internalization) model via a qualitative and quantitative analysis. An analysis compares the traits of the SECI model and NIWC PAC's KM approach. It will also attempt to prove if the workforce has leveraged the Center's efforts to promulgate and use the knowledge, workflows, and processes made available to them effectively.

F. THESIS STATEMENT

The goal of this research is to analyze NIWC Pacific's KM approach to deploy initiatives that give Center employees the methodologies and tool sets to absorb information and complete the necessary tasks to meet its business objectives as asserted by the SECI model in lieu of its CPI/Workflow and KM efforts.

G. REPORT ORGANIZATION

The first chapter of this analysis presents an overview of the persistent issues that the Center workforce grappled with when it came to sharing relevant information. It also provides an insight to the practices employed to make a course correction to remediate the

said issues. Chapter II will provide the insight of NIWC PACs current state, Chapter III will provide an analysis NIWC Pacific's efforts; and lastly Chapter IV will provide a conclusion and ways forward to avoid previous mistakes in sharing and processing vital information across the command.

H.   SUMMARY

This chapter provided insight into NIWC Pacific's background issues with process management and KM and eventually creating a unifying presence of business products and material, content management, maintaining information relevancy, and involving employee feedback to establish a continuous approach to cultivating an evolution of knowledge sharing at the command. The problem statement laid foundation for the creation of the research questions and the essential nature of this study and why it matters for a diverse organization like NIWC Pacific. The next area will take a deep dive into the methodology of practice employed by NIWC Pacific and theories used in the analysis.

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II.   IMPLEMENTATION REVIEW

The background provided in Chapter I illustrated the multitude of issues that persisted at NIWC Pacific. It also illuminated the various efforts and methodologies applied in efforts to make a course correction of how business processes and knowledge was cultivated and shared at the command that ultimately were addressed by the study of this research. The scope of this chapter will be focused on the practices used for this assessment. I will first review the process management efforts/methodology the command embarked on and how it addressed established a CPI framework in conjunction with addressing the process stovepipe by documenting business products with the leverage of proper requirements collection. Secondly, I will also review the Center's KM of content and workflow processes and how its advocacy of employee participation transformed how information is shared within the organization. For the third area, I will review the SECI model and synthesize why this approach was picked to assess NIWC PACs Process Management and KM efficacy.

A.   PROCESS MANAGEMENT

This section will offer definition of process management, requirements collection/ management, and KM. It will so on its theory, practice, and its impact on the business practices at NIWC Pacific.

Process management at NIWC Pacific identifies a successful process as one which is repeatable, measured, and maintains identified and established requirements. The true intent of process management at the Center is to install a standardized approach to creating and approving processes across the command; in conjunction with expectation that the intended processes produce predictable outputs and performance objectives without variation. The institutionalization and standardization of process across the command fosters an environment that ensures its business operational maturity through continuous process improvement (CPI) through baselined and adjudicated processes by established and identified stakeholders. NIWC Pacific, through CPI has set the precedent by establishing a framework for the command to use introduce, develop, and eventually

adjudicate processes across the command in a consistent manner; in addition to identifying the types of process assets and by identifying the roles and responsibilities of the participating parties as well.

Process owners across NIWC Pacific have applied stringent requirements collection at the onset creating both their processes and workflows daily across the command as well. Functional requirements such as workflow assignments, state transitions, clearly articulated workflow products, and end states have made a considerable difference in the efficiency of work and turnaround rate of process execution; particularly when transitioning away from the cumbersome approach of processing various forms across the command in email to using Atlassian's JSM suite.

Depending on the level of granularity, the initial task of capturing the correct set of requirements can be either easy or relatively complex. It is directly related to the desired outcome of the process, artifacts created and collected, among many other criteria as well. Stakeholders ranging branch heads across the command to cybersecurity security teams have extensively and effectively identified their specificity of outcomes to minimize or even eliminate process variations in their workflows all while managing a high volume of work which program of records and supervisors need to in order to meet their business objectives. Both business processes and workflows across the command have their various requirements managed based on the business need of the stakeholders as well. Performance and content visibility metrics are constantly analyzed to assess their merit or relevancy. Feedback mechanisms such as capturing best practices, user community input forms, and crowd sourced knowledge bases are captured and incorporated into business products or workflows when applicable as well.

Throughout the years, KM has acquired an array of definitions; some of which meld into one another to an extent despite of the variations or vagueness. One of the early critiques of the concept of KM is that it did not clearly conceptualize the overarching vision of how organizations will function as a result of applying methodologies considered to fall in line with the definition of KM. The most translatable definition of KM is "creating knowledge-rich environments and knowledge-rich interactions to support the conduct of work" (Dieng-Kuntz & Matta, 2002, p. 10). KM is not technology specific, but the true

return is the practice of curating and sharing knowledge while creatively leveraging platforms to best proliferate work products and related information within an organization.

As mentioned previously, NIWC Pacific is an organization rich with information. One of the tenants of KM is facilitating information mining for process improvements coupled with continuous requirement collection to further improve cycle time in service requests and products used in business execution. To expand on that point, another facet that some may consider to be the epicenter of KM is to foster an environment where activities conducted by an individual are improved upon by the evolution of their professional insight which is also continuously improving as well (Van der Veer Martens & Hawamdeh, 2010). The direct translation of the improvement in business processes or work practice is the individual's capability to harness the curated approach to performing their daily duties—part of which takes place during the initial requirements collection process and then reinforced as the process is scoped to its precise intention of outcome, then eventually approved through the process owner's vetting cycle.

KM is not a passive approach by any means. Knowledge requires constant curating and enforcement for it to be an effective asset for an organization. The Center departments contain a series of document processing that was previously done extensively through emails which made it a considerably manual effort in routing them through the various approvals and even more so in assessing the quantity of submittals and their approval rates

On May 15, 2008, Secretary of the Navy (SECNAV) Instruction 5220.14 was distributed throughout the DON with the subject head reading: Continuous Process Improvement (CPI) set forth the instruction which would set the foundation for all commands to establish and promote programs that would improve capability by "improving the quality of support to the warfighter through improvements to core business operations processes that provide and sustain capability." What followed was NIWC Pacific's efforts to promulgate and sustain CPI efforts by establishing a baseline of methodologies to build upon and curate as time passed.

With leadership support, qualified personnel were chosen and tasked to develop an array of products and methodologies to support a robust CPI framework to capture and re-

interpret loosely documented process assets extensively used across the center to conduct business and support programs of records. Process assets were defined as the following type items:

- Checklists
- Forms
- Processes
- Procedures
- Plans
- Policies
- Templates
- Training
- Guides

To properly manage the various assets at the command two groups at NIWC Pacific, Corporate Strategy and Engineering, worked together to develop a series of materials that would lay the framework to solidify and spearhead CPI efforts across the command with specificity to clearly illustrate pillars of the Center's control and management of assets. The Standard Process Assets Architecture (SPAA) (GU-OPD-1000098, 2012) developed at NIWC Pacific in December of 2010 set a precedence for standardization for various components of interest at the command, but one specific component it set a springboard for CPI efforts at the Center moving forward. Within the SPAA were definitions that outlined components of NIWC Pacific's CPI areas of practice such as:

- **Organizational Set of Standard Processes (OSSP)**: Established the approved series of tailorable processes for use by the organizational units or IPTs.

- **Process Architecture:** Defines process interdependencies and their hierarchical relationship with one another.

- **Deviation Requests:** Set the expectation that any and all requests to deviate from established processes at the command must be vetted and adjudicated by the CPI-CCB.

As the SPAA was being developed, other important guidance was established that would empower CPI-related activities which the command leverages uses to this very day to ensure that business practices mature in the most capable way possible. The following assets continue to prove their prevalence in aiding the command with CPI practices are the following (which also include their purpose/objective statements as well):

- **Organization Process Definition (PR-OPD-1000097, 2021)**: "Establish and maintain a usable set of organizational standard processes, tools, measurements, and other information in support of process improvements. Organizational process assets enable consistent process performance across an organization and provide a basis for cumulative, long-term benefits for the warfighter."

- **NIWC Pacific Process Management Life cycle (GU-OPD-1000163, 2016)**: "Establishes a mechanism for developing and implementing processes that are standardized, repeatable and predictable. It also provides a mechanism for process integration which supports organizational maturity, process stability, continuous improvement, and competency alignment."

- **NIWC Pacific Document Identification Standards (GU-CFM-1000121, 2022)**: "Provides guidance when assigning document identifiers and versioning for configuration control of process assets. In this context, process assets include processes, procedures, templates, tools, policies, plans, forms, and databases."

- **CPI-CCB Process (PR-CFM-1000086, 2015)**: "Describes activities that occur prior to development, during review and development, and during adjudication of NIWC Pacific Center-level process assets that impact multiple competencies throughout the command."

Two of the above products are important to point out. The Process Management Life cycle (PML) and the CPI-CCB Process.

As NIWC Pacific's CPI efforts were maturing, the Knowledge and Process Management Office developed the PML for Center users and process practitioners in efforts to explain how Center-wide process efforts work in a digestible fashion. Among the pieces of information, it concisely identifies key participants of the process life cycle. This insight established the key participants and stakeholders involved with curating process related products and assets. Since the onset of its CPI initiative, NIWC Pacific has made a concerted effort visualize the use of its corporate knowledge by leveraging its most important assets…its very own workforce. "…since knowledge is created and utilized during the execution of business processes, knowledge itself separated from the business process context does not lead to the right action towards target performance" (Han, Park, and Jo, 2012, p. 1). One of CPI's pillars of target performance is minimizing variation, waste, and increasing efficiency. With the direction offered by the PML the user community, specifically identified process practitioners and stakeholders, would be reinforced with clear and actionable direction on how to manage its processes and products. The PML's is organized in such a way that participants are instructed on how to perform its functions by breaking down the following key sections:

- **Roles and Responsibilities**: Clearly articulating the individuals and groups and identifying actions they are expected to perform to help sustain the Center's CPI efforts:

- **Introduction to Process Management**: Identifies the different process levels that can exist (i.e., Job Aids, Procedures, High Level Processes) and clear definitions of each and how they all may interact within a value stream of knowledge.

- **Process Management Life cycle**: Breaks down the various stakeholders, actions, requirements, and expected outputs within the life cycle to introduce and codify a process asset at the Center by identifying each of the following process steps:

-

- Proposal Development

- Process Development

- Product Review

- Implementation

- Management

The encompassing body of work that is the PML permits an employee with little to no knowledge of CPI an opportunity to digest the actions necessary to be a participant in current and future process-related efforts rather than just being a spectator.

There is an old saying that states "Garbage in, Garbage out." That is effectively true even when capturing knowledge in the development of a business process. To mitigate the impact of quality of process assets used at the command, every asset with high visibility must follow an established template to effectively capture and scope the business requirements and actions to meet its objectives. The aim of requirements collection is to eliminate as much outcome variation as possible, so the intended process performs within scope as identified by the stakeholder ("Project Management Institute PMBOK Guide," 2013, p. 110). One of the more commonly used components of NIWC Pacific's CPI efforts is the NIWC Pacific Standard Process Template (TM-OPD-06 v3.2, 2015). SMEs and process management representatives work carefully to collect active knowledge for and future improvements by precisely interpreting the areas of a business process by carefully filling in the following areas:

- **Purpose**
- **Scope**
- **Activities**
- **Roles and Responsibilities**

- **Entry Criteria:** Used to initiate the process

- **Assumptions**: Caveats/presumed follow-up actions to conduct

- **Business Rules**

- **References**

- **Process Owner:** Identify the owner of the process

- **Exit Criteria**: Used to verify that the end state of the process was met.
- **Inputs**: Captures the required artifacts necessary to justify the processing of the change of said process
- **Outputs**: Verifies that the necessary components of the change were in fact applied
- **Feedback:** A mechanism the user community can use to supply input to the processed being used.
- **Tailoring**: Used to capture at what point the process can be deviated
- **Measures** Captures performance statistics

As more processes were captured and placed into the PAL, an active effort was made to collect more requirements that would in turn assist the maturity of the products, processes in particular, the Knowledge and Process Management group established collecting Best Practice (BP) submittals. Employing this methodology established an even tighter, and strategic, relationship with the user-base by allowing them the ability to infer their experiences in applying the processes in the form of feedback to further refine the way business was conducted. Best practices (BP) injected yet another avenue of knowledge transfer (Bratianu, 2015, p. 266). Level of expertise in performing a process was not an attribute sought after; but more so an end-user's perspective in the experience of executing a process. This approach in leveraging the user community's experiences signaled that the processes were not necessarily unidirectional in nature; meaning that when identifiable issues, inconsistencies, or areas of improvement were discovered they were not to be ignored. In fact, practitioner input is key to the maturation of a process, organizational learning, and internal efficiency (Bratianu, 2015, p. 133). To promote the use of capturing business practices related to process-related products at the command, the KM team developed and implemented a Best Practice Selection Process. Crowd sourcing best practices from the practitioners to further collect actionable knowledge has enabled NIWC PAC collect over 247 best practices to date. A best practice isn't arbitrarily submitted or promoted, either – based on the criterion for selecting best practices to the NIWC PAL (2019) a submitter must assess whether his or her submittal meets the following requirements prior to its submission in efforts to mitigate a flood of entries for adjudication:

Figure 2 provides the criterion requirements a BP must meet in order for it to be submitted for review and adjudication.

Figure 2. Best Practice Criterion. Source: "Criterion for Selecting Best Practices for Posing to the NIWC PAL" (2019).

If a BP candidate meets any of the criteria above, it can be submitted for CPI-CCB review where it undergoes adjudication whereby if a BP is approved, it is then posted to the PAL for command view. Although rare, in certain cases when a BP is vetted and is deemed to improve an existing process asset, it is then absorbed into that asset through the existing CPI-CCB process as well.

As processes are introduced and developed, the actions of the approving body are the most pivotal in releasing reviewed and adjudicated products for the command to consume and leverage on a regular basis. The CPI-CCB process sets the example for the entire command on how these business products are vetted. Working in concert with NIWC Pacific's Process Management Life cycle (PML) it has established a collection of actions that must be conducted to introduce an asset to the command for use. Depending on if the process in question is in need of additional resources, respective approval boards will need

to vet and adjudicate said proposal prior to their development and subsequent submission to the CPI-CCB. Figure 3 illustrates the CPI-CCB process for NIWC PAC.
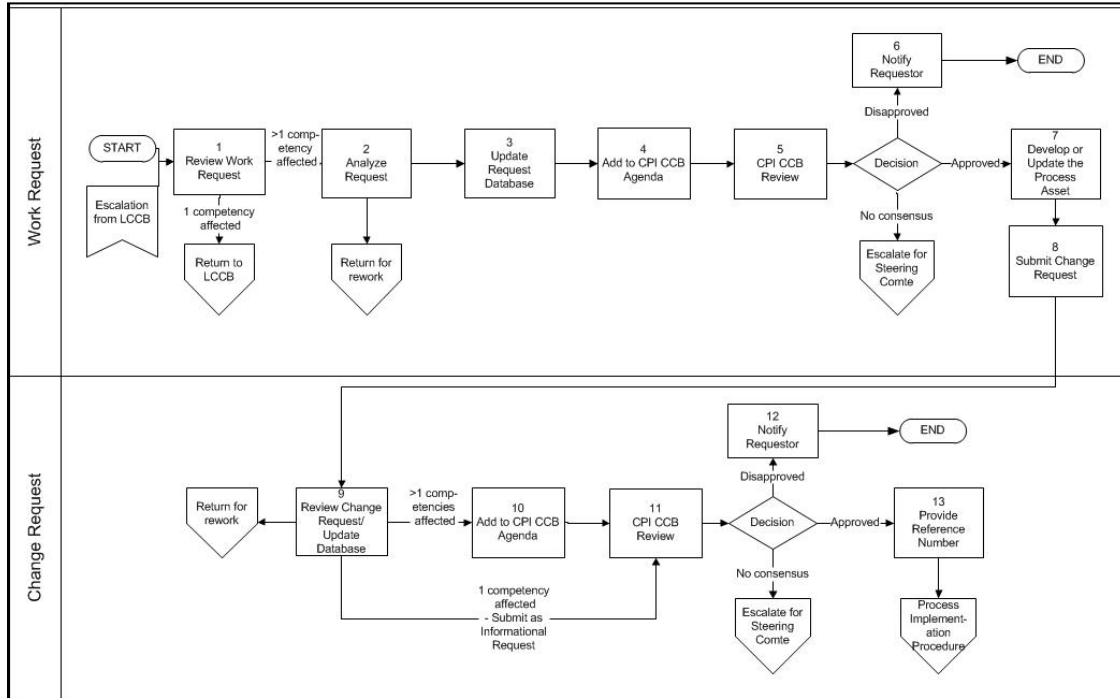
Figure 3.   CPI-CCB Diagram. Source: "CPI-CCB Process" (2015, p. 1).

Each step within the CPI-CCB process illustrated above involves a series of actions that are explained to the workforce in detail. The CPI-CCB is not a governing body that assess every product that exists at the command. It strictly covers process assets that impact multiple departments which incur a risk if one of these shared assets are changed without one of the stakeholders being made aware. Process assets that only impact one department are not governed by this process, but they are encouraged to follow the same documenting rigor as applied to larger process assets to ensure that every detail and local dependency is captured. Upon completion, those assets can be submitted as "Informational" items to keep the CPI-CCB abreast of newly introduced, or changed, locally managed assets as well. Both high-level to locally managed process assets are tracked and maintained for effectiveness and maturity through various CPI components.

B.   KM THROUGH CONTENT SHARING

One of CPI's focal points is the ongoing maturity of how the conduct of business and products and services are leveraged. KM works in concert with CPI to make the right information/content available through the practice of scoping requirements and developing the solutions to process business information or products in a cohesive manner as well. KM is a key component for an organization to harness when aiming to successfully realize its strategies through the established business practices when attempting to appropriately formalizing, categorizing, and sharing information (Obermayer & Toth, 2021, p. 586).

The two major components to NIWC Pacific's realization of sharing authoritative information processing business workflows at the Center are Atlassian's Confluence and JSM. The two can be identified as the following:

- **Confluence**: A document/content collaboration suite used to share and visualize information easily. Inherently it contains the capabilities to apply permission controls, document and content versioning features, broad announcement functions, user-base commenting features, and broad content/file search capabilities.

- **JSM:** An IT service management solution used to capture submittals and route them as necessary. Submittals can be defined as requests for a particular, or an array, of business functions to collect, process and adjudicate via workflow assignments so identified individuals approve, deny, or address items particular to their work functions.

JSM is particularly important. Especially for many teams and departments across the command. The JSM completely transformed how NIWC Pacific processes its service requests, manages, and visualizes actionable information. For example, NIWC Pacific's Cybersecurity Workforce Management team (CSWF) is comprised of five individuals that conduct policy enforcement for the command and is responsible for assessing approximately 3,886 Cybersecurity professionals. Part of this assessment is reviewing qualifications of individuals identified as CSWF members through the Cyber IT/CSWF

and Qualification Manual (SECNAV M-239.2, 2016) as Specialty Areas (SAs). A small example of such specialty areas is:

- Technical Support Specialist (422)

- Software Developer (621)

- System Security Analyst (461)

In total, there are 42 separate SAs in the Cyber IT/CSWF domain, and they all have their own unique qualification criteria and qualifications to validate. The CSWF team was tracking all 3,886 individuals (Civilian, CTRs, and MIL) in an Excel spreadsheet known as the Master Roster (MR) in a team share drive. Additionally, the CSWF works hand in hand with individuals across the command known as Information System Security Officers (ISSOs) and Contracting Officer's Representatives (CORs) who represent the various departments at the command with employees (both Government and CTRs) that are members of the Cyber IT/Cybersecurity workforce. The CSWF team, CORs, and ISSOs works together to address matters such as missing or lapsed qualifications, training objectives and administrator access to systems used in support of PORs. These administrators often need elevated access to the systems they support, and the aforementioned teams work all work together to vet workforce representatives based on their qualifications (commercial certifications/training/education) in conjunction with their security clearance as stated in SECNAV M-5239.2, section 3.d, p. 7:

> Each Authorized, Enhanced, and Core User of DON IS must maintain the appropriate security clearance; have a current user access agreement (e.g., System Authorization Access Request (SAAR) and, if applicable, a Privileged Access Agreement (PAA); and complete approved cybersecurity awareness training prior to accessing DON networks.

SAARs and PAAs involve vetting, adjudication, and participation by various groups at the Center which include:

- CSWF Team

- ISSOs

- Managers

- CORs

Additional participation of by other groups that work in conjunction to processes and communication of the status' regarding the CSWF workforce also include Research, Development, Testing & Evaluation (RDT&E) Operations Center (ROC) and Human Resources Office (HRO). Prior to tracking and adjudicating all of the communication, and processing of SAARs and PAAs in JSM were conducted via e-mails, a remedy ticketing system, phone calls, and finally updated in the excel MR.

Since adopting JSM, the CSWF team manages and executes all its requests (1,679 to date) in one central location by which all participants can access, adjudicate, and visualize performance analytics thus streamlining the way business is conducted. Figure 4 illustrates the communication threads prior to and after leveraging JSM.
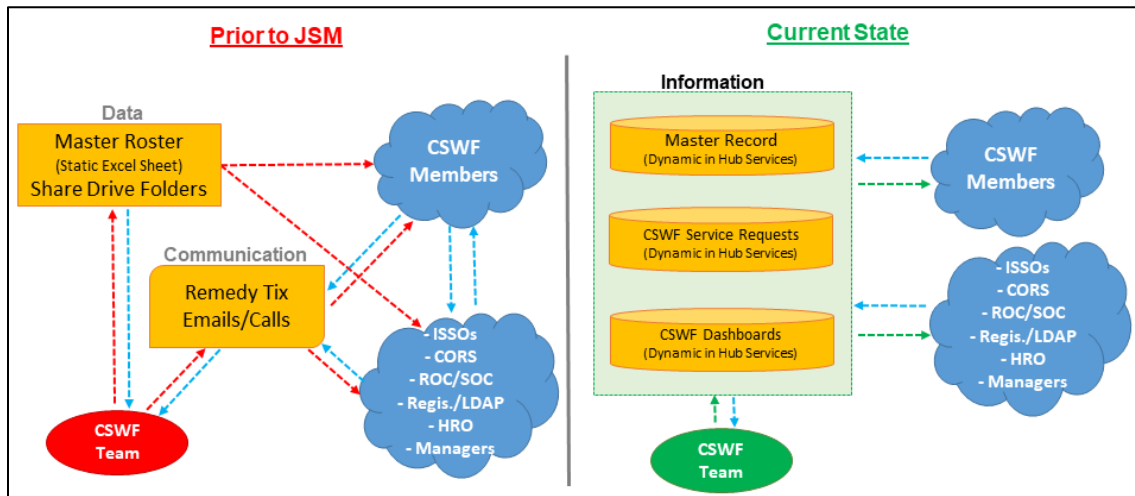

Figure 4.   CSWF Data Management – Before and After Leveraging JSM

JSM's effectiveness has reach so far into the command that various departments have moved their manual approach of submitting requests through e-mails into its workflow capabilities that there are over 160 projects, both in use and in development,

across the command. Figure 5 provides a visualization of where users can find easily accessible request workflows via the Hub landing page.
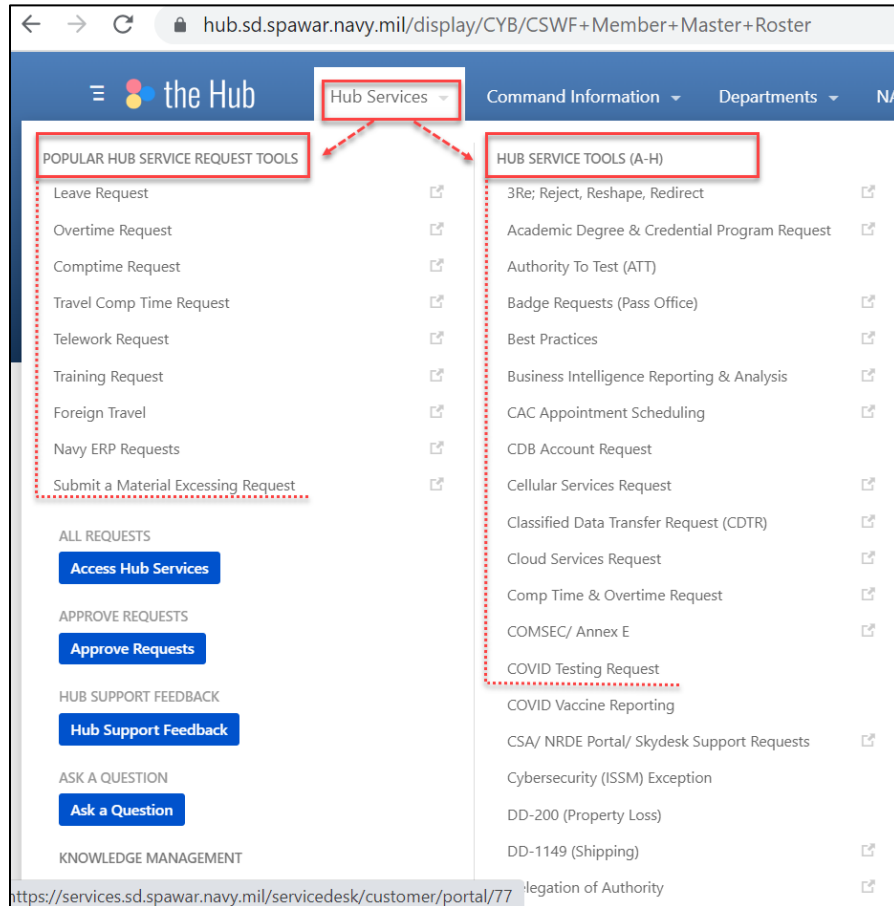
Figure 5.   Partial List of JRM Request Workflows. Source: Pendergrass (2022a).

Confluence has played an important role at NIWC Pacific. The Center's repository for authoritative, command-wide information, is known as the Hub. Its effectiveness is attributed to the painstaking process of IPTs collecting requirements to establish the aesthetics, functionality, and methodology in which to share information to in the form of content to the command. NIWC Pacific's approach to content management and KM presents an interesting correlation with what is described as Enterprise Content Management (ECM) whereby it is defined by the "the strategies, methods and tools used

to capture, manage, store, preserve, and deliver content and documents related to organizational processes" (Dinh, Rickenberg, Fill, Breitner, 2014, p. 3549). NIWC Pacific's administration of content is similar to how processes, and related assets, are managed via CPI level whereby rigor in managing the platform and information therein (but at a more focused scale) ensures that the enterprise that is the workforce only have the most relevant resources and information available for daily use. The Hub's layout and selected appliances by way of macros which are leveraged to organize and find various business products and workflow requests is a prime example of ECM. Figure 6 shows the Hubs' landing page and its established aesthetics and navigation for ease of use. Figure 7 illustrates one of the many ways content is categorized as well.
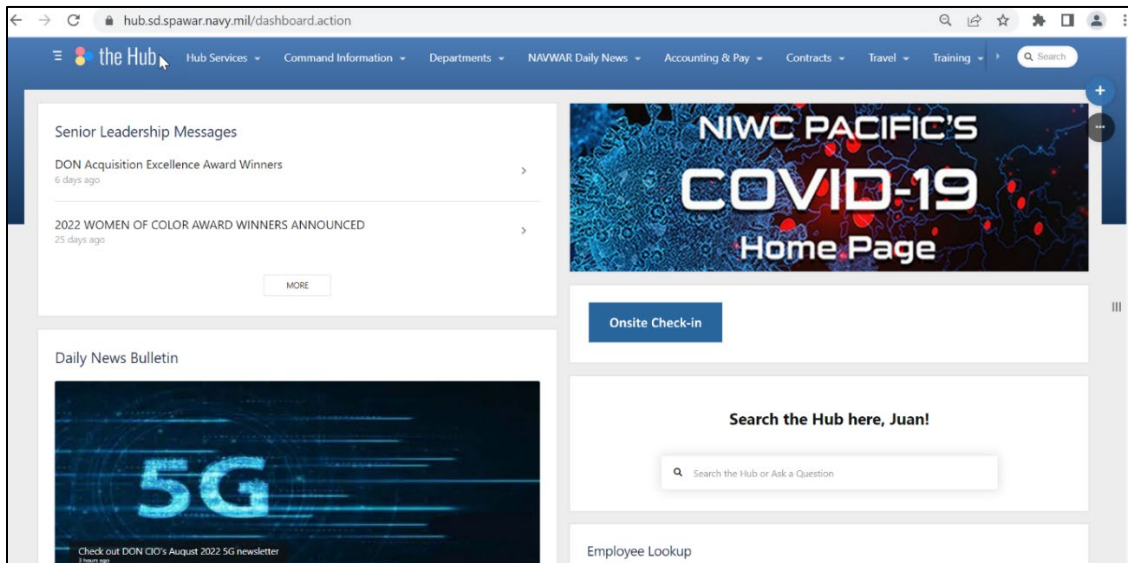
Figure 6.   Landing Page. Source: Pendergrass (2022a).
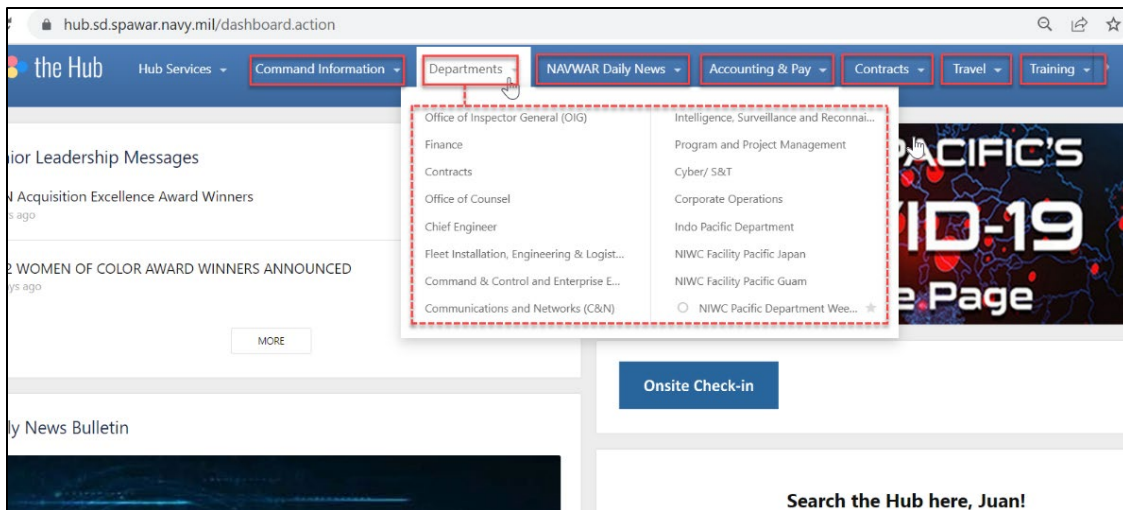
Figure 7.   Landing Page with Partial List of Departments and Services.
Source: Pendergrass (2022a).

Another interesting comparison to NIWC Pacific's KM approach to content management is how it dovetails into ECMs Knowledge Based Content Management (KBCM) where it combines content and knowledge development into a cyclical event (Dinh, Rickenberg, Fill, Breitner p. 3549, 2014) much like CPI. An important component of this is the various Communities of Practice (CoPs) across the command. These groups assure that members within the CoPs are involved in the development of new and imaginative ways to keep maturing their content and related information which lends itself very well in comparison to the KCBM framework. KCBM's framework is broken down into four different areas which is relatable to NIWC Pacific's s KM approach to sharing and managing authoritative information. The four components will be identified in Table 1 and will contain a breakdown on how NIWC Pacific KM has met these areas.

Table 1.   KBCM Framework. Adapted from Dinh et al. (2014, p. 3549).

1. Content Assessing	**Definition:** The actions by which new content is introduced and matured.
NIWC PAC's Correlating Approach	

NIWC PAC performs these tasks by way of CPI and KM efforts to this day by regularly updating and verifying that all material is up to date through quarterly reviews conducted by assigned content managers. Additionally, the KM team establishment of a Community of Practice (CoP) is aimed at empowering content managers with new techniques to improve content reviews and relevancy assessments through the use of features available in Confluence in addition to analytics reviews which will be covered in the next chapter.

2. Content Organizing	**Definition:** The structuring of content through "editing and transferring it into content objects and metadata concerning relevant knowledge components."
NIWC PAC's Correlating Approach	

The Center KM team has met this pillar by establishing the Hub in a methodical approach which covers the use of labels to organize, distribute, and display content and products throughout the platform. Making it easy to update material in one central location and it reflecting that update seamlessly across the environment. Each document is loaded in its own respective page; the use of labels and making each product its own object makes it easier for end-users to locate the specific item they are looking for.

3. Content Sharing	**Definition:** Assembles organizational objects "into information products and transforms" them "into targeted publications using different delivery methods"…which "then become organizational knowledge which enables organizational learning and promotes the development of intellectual capital."
NIWC PAC's Correlating Approach	

The PAL easily fits into this pillar seeing how it is the Center's authoritative repository of all business products such and processes, procedures, guides et al. Additionally, one of its main functions is to retain corporate knowledge used by the workforce on a daily basis.

4. Content Using	Definition: The primary goal of this area is "to transform knowledge into wisdom, it is vital to consider the primary mechanisms for knowledge application such as directives, organizational routines, or self-contained."
NIWC PAC's Correlating Approach	

The JSM (or Hub Services) is a perfect example of how NIWC PAC employees leverage this system to route various business, and organizational requests across the command. Hub Services also allows for the visualization and sharing of information to accelerate other dependent business processes and the decisions whether to execute them based on requisite status' or workflow states.

In conclusion, NIWC Pacific's efforts in establishing the Hub, its aesthetics, categorization of content and corporate knowledge, and integrated approach of leveraging a workflow environment to process thousands of requests from various departments and projects across the command is successfully proving its worth to the workforce. The management of knowledge, content, and work products is not done without design, but with the careful deliberation and implementation of teams with an identified purpose to curate every aspect of information across the command. It's decentralized approach of establishing content managers with keen knowledge of their respective departments has paid off tremendously. What has contributed to the success of what could be considered an image of ECM is the establishment of CoP groups focused on harnessing interest through instruction of the latest methodology to upkeep their respective information. The constant exchange of ideas enables the maturity of processes and business products to thrive.

C.   SECI MODEL

The purpose of this section is to analyze a theory to assess the efficacy of this research. The theory in question is known as the Socialization, Externalization, Combination, Internalization (SECI) model established by Nonaka and Takeuch in 1996 whereby the model itself is described as a process that transforms informal knowledge and formalizes it through successive process. A comparison between SECI and efforts embarked by NIWC Pacific will be conducted. The outcome of this analysis will be an

evaluation of whether the command's initiatives address the separate components of the SECI model in formalizing tacit knowledge into explicit knowledge. SECI presents a foundation for organizational knowledge which premise revolves around a continuous cycle of turning subjective knowledge into an objective one (Bratianu, 2015, p. 105). The aim of the major components of SECI:

- **Socialization:** The fostering of a collaborative environment where knowledge is effectively shared through face-to-face (tacit to tacit) communication (Zhang and Kosaka, 2014, p. 2).

- **Externalization:** Forming informal, or common knowledge, into formalized solution in an individual basis as a result of collaborations thus converting knowledge from tacit to tacit into tacit to explicit (Zhang and Kosaka, 2014, p. 2).

- **Combination:** The integration of different knowledge processes, or components, into improved solutions or improved processes/business rules. This particular pillar involves the analysis and organization of Knowledge (Zhang and Kosaka, 2014, p. 2).

- **Internalization:** Formalizing codified processes at an organizational level to an individual one – to the point where the individual's actions/ performance is a reflection of the work culture.

Now that the SECI definitions have been established, each pillar will be compared to the CPI and KM efforts employed by NIWC Pacific and verify whether it meets the suggested cyclical outcomes identified by this cornerstone theory of knowledge conversion.

Prior to the codification and enforcement of CPI and KM, the socialization front of this model was very prevalent across NIWC Pacific. Tacit to tacit method of communication in an individual setting fosters few issues, but in an organizational one it can be detrimental of how business operates. It took the form of tribal knowledge and created a silo-effect where employees focused on their immediate objectives which resulted

in a collective outlook that that "the rest of the company is not a priority for them" (Select Strategy, 2001, p. 4), which is exactly the barrier effect that was reinforced across various departments at the command. As a result, tacit to tacit knowledge retention bred a lack of documentation of corporate knowledge, which robs the organization of maturing business processes and work culture. Siloed environments are prime breeding ground to create communication barriers and subcultures which make it increasingly difficult to promote or promulgate organizational knowledge and knowledge sharing (Select Strategy, 2001). Figure 8 depicts the downward spiral of silos can have a dangerous and long-lasting effect in any organization as illustrated below.

Each division is focused on its own primary objectives

Divisions do not communicate sufficiently or effectively because of the factors that feed into silo formation

Divisions do not co-operate with each other because they are uninformed

The lack of co-operation breeds resentment and a reciprocal lack of giving

Division members feel isolated from other divisions and focus work effort within their own division

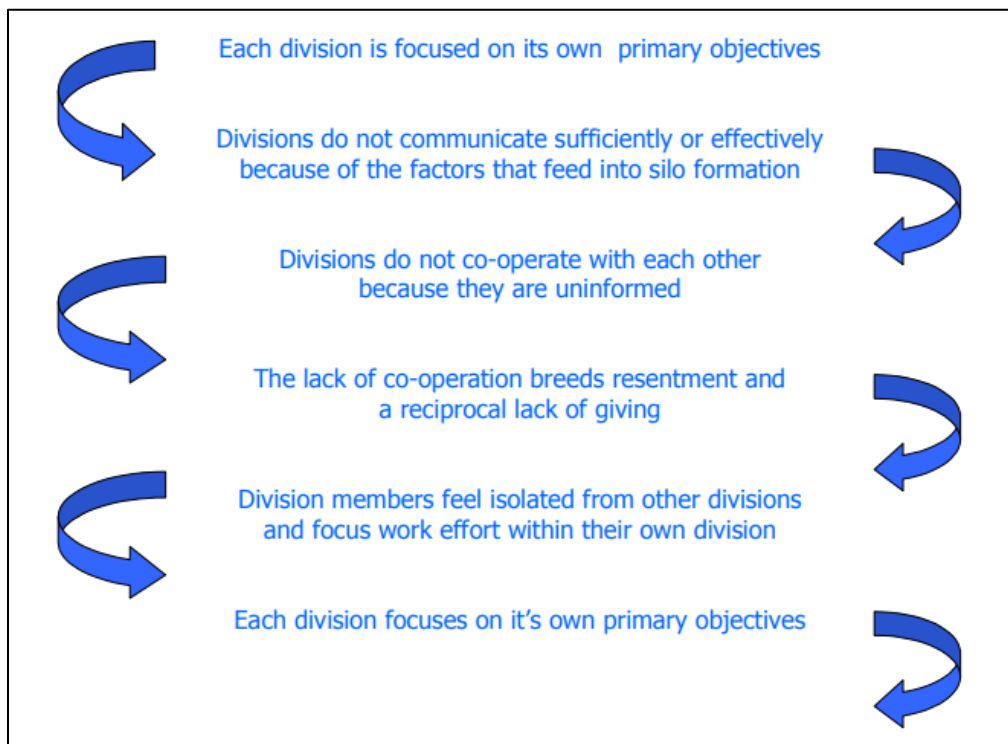Each division focuses on it's own primary objectives

Figure 8.   Spiral Effect of Siloes. Source: Select Strategy, 2001

The effort to offset this effect can be considerable if an organization isn't proactive in promoting values aligned with business objectives and knowledge sharing. NIWC Pacific's version of externalization in the model presents the next evolution in its approach to organizational maturity and knowledge management.

NIWC Pacific's CPI and KM institutionalization positioned the organization's move away from a casual approach to information gathering and sharing. During the externalization phase of the model NWIC Pacific's CPI efforts, championed by executive leadership, moved the organization into formalizing its corporate knowledge by working with SMEs to capture and streamline products used at the command to perform actions in support of business objectives and programs of record. As a result, this effort the command's PAL contains over 3,600 products and objects (i.e., illustrations and flowcharts) under configuration control by a dedicated CPI team and adjudicating body to ensure that the corporate knowledge used at the command to execute various functions actions in support of our nations warfighters are relevant and up to date.

The combination phase of the SECI model really shines a light to NIWC Pacific's efforts of improving how the command collects requirements/knowledge, executes, and matures its business assets. These efforts involve empowering its workforce and how it manages its various business requests across the Center. NIWC Pacific's KM team, through the appointment of various leads across the command, has established a decentralized management of the Hub by identifying content managers to cultivate and mature content in the various areas of the Hub. This is particularly important because the Hub publicizes the many services offered by the different departments that internal customers use to conduct business. To facilitate this ongoing practice of content upkeep, the KM group has established the Hub Content Community of Practice (CoP) along with an online presence in the Hub as well. This way CoP members can access resource such as:

1. Page Design Resources offers instruction on how to:

   o Create content within the specified guidelines by the KM team
   o Permission schema creation to ensure content security
   o Template creation that other departments can use for meeting artifacts
   o Instruction on how to better leverage content through writing and illustration

2. The use of macros make better use of displaying and sharing information in the form of

- o Analytics
- o Tables
- o Search functions to find information more efficiently
- o Create surveys/questionnaires so departments can collect actionable feedback

3. Writing style to effectively communicate to an audience.

4. A section for Hub Administrators to leverage to more effectively manage the Hub and the functions therein.

5. JSM integration.

The final pillar of the SECI model is internalization. NIWC Pacific has done an exceptional job of forming teams across the command by seeking employee participation in many different forms; thereby making positive headway in breaking down the siloes that once prevailed in many departments. The ISSOs and CORs mentioned above are also engineers, PMs, logisticians, IT professionals, and process improvement practitioners. The same is said with the various members of the Hub content manager community that make a considerable amount of effort to maintain the integrity of their respective content with the assistance of the KM team. The involvement of the Center's various cadres has created an environment that has incentivized the involvement of employees through the reinforcement of knowing that what they are contributing to will be a long-lasting solution through the use of codified and absorbed corporate knowledge. Encouragement that their individual effort to a greater solution pays dividends at the end of the day because employees previously working in silos "are only likely to accept solid solutions that solve the problem" (Select Strategy, 2001, p. 8).

D.   SUMMARY

This chapter summarized NIWC Pacific's implementation of CPI, KM through content management. It also studied the methodologies used in leveraging the chosen software suite to improve the representation and processing of service requests by comparing it to one of the cornerstones of KM theories—the SECI model.

Chapter III will focus on the analytical use of the Atlassian suite to drive content maturity and service processing throughout the command.

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III.   ANALYSIS OF KM USE OF STATISTICS

The focal point of this chapter will be to view and assess how NIWC Pacific drives the maturity of its content, process assets, and workflow requests. The primary research questions drive home the inquiries whether NIWC Pacific properly manages and shares knowledge across the command; and secondly, if the command has effectively leveraged its selected environment to conduct business and mature them as necessary.

A.   PRIMARY RESEARCH: EFFICACY OF PROCESS MANAGEMENT EFFORTS AND KM THROUGH CONTENT SHARING

This research assessed the effectiveness of NIWC Pacific's efforts to get the right information to its user community and whether that information methodologies employed have saturated its workforce effectively thereby empowering a work culture to mature its business practices/products and organizational knowledge.

The CPI efforts and products that were created and leveraged such as the PML, process template, and initial guidance such as the SPAA set initial framework for the CPI-CCB to cultivate and mature corporate knowledge at the Center. The collection of requirements through working with SMEs and populating the templates offered a way for stakeholders to minimize variation of outcomes as practitioners employed their business activities.

First, the KBCM framework offered some insight on what is known to effectively manage content throughout a four-step life cycle then the SECI model was used to assess the workforce's transformation from using casual knowledge to formalized knowledge to reinforce business objectives at an organizational level which is then resonated translated at the individual. With the information supplied regarding NIWC Pacific's CPI and KM maturity efforts and comparing them to both the SECI model and KBCM the two research questions will be answered.

1. Actions/Practices Conducted to Ensure Knowledge is Managed and Shared across the Command

The first primary research question asks if NIWC Pacific has conducted the necessary actions to ensure that corporate knowledge effectively curated and disseminated. The involvement of the various Hub content managers that regularly participate in the CoP meetings which allow participants an opportunity to further refine content management approaches. The cultivation of new ideas and lessons learned by the Hub content managers fosters an environment of constant maturity; but most importantly a maturation which occurs under the established business rules to ensure uniformity. Additionally, as it stands the command's authoritative repository for all processes and products used to conduct business, the PAL, contains around 3,600 unique objects which are all vetted and under tight configuration control by the CPI team. Additionally, the Hub, contains 277 unique sites, or commonly known as spaces. Analytics show that within the date range of 3 January 2022 and 1 August 2022, the Hub has been:

- Accessed and viewed for 1,168,967 times.

- 55,155 page edits to update content were made.

- 1,440 comments were left in each page

   o This signifies communication between the user community and content owners.

- 7,088 page watches were applied

   o Translates to the number of areas the user-base is setting notifications of updates made to a particular asset or material in the hub

- 7, 504 unique content views made

Additional statistics are provided below. The important thing to consider is that as of 2021 the number of employees at NIWC Pacific is floating around 5,400. The

significance of these metrics are objectively astounding because the workforce is repeatedly visiting and using the content being managed on the Hub. The 55,155 page edits signify that material is constantly evolving or being replaced to ensure that the user base is getting the most relevant information made available to them. Figure 9 illustrates information such as the number of visits in the Hub, number of edits applied to content, comments (feedback), watches (users following specific areas for updates), and the Hub's six most popular areas visited by employees.
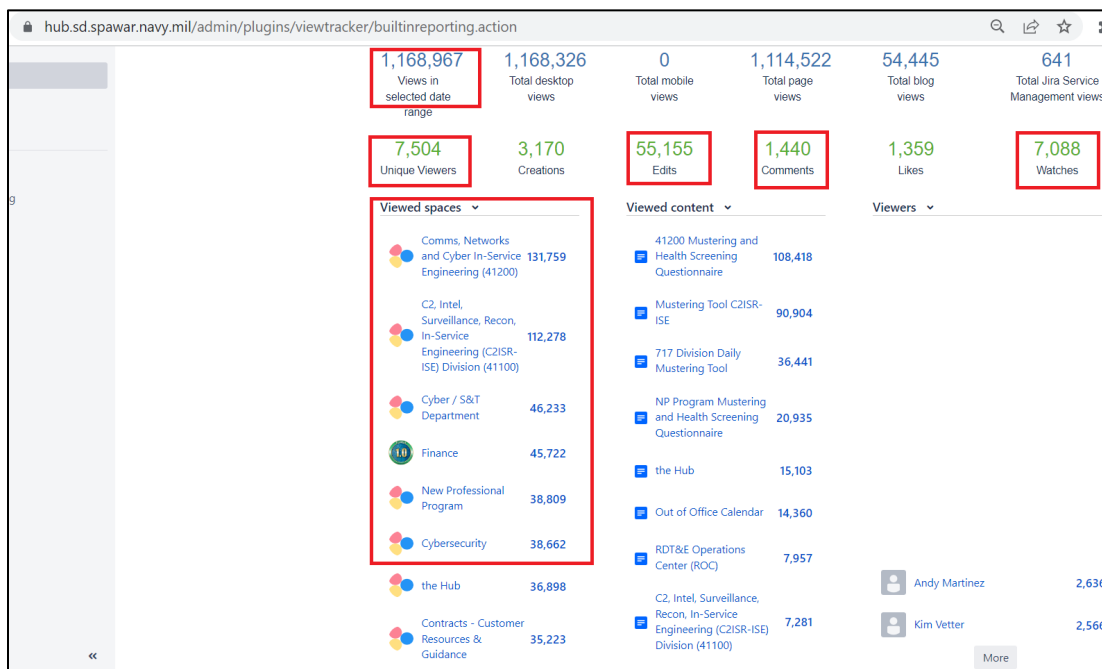

Figure 9.   Hub Metrics. Source: Pendergrass (2022a).

2.   Proficiency of Platform Use To Conduct Business Practices

The second primary research question asks if NIWC Pacific is using its platform proficiently to complete the goals and objectives set before them. To answer this inquiry, I first assessed how JRM has impacted the way CSWF processes its requests. Secondly, I analyzed the volume of requests the Center as a whole has amassed as well. The visualizations will set a quantitative visualization to illustrate the number of requests the command submits in order to meet its internal and project business objectives.

Firstly, the CSWF team only has a support staff of five people. As a result of moving its processing efforts into JRM, it has been able to effectively visualize its CSWF membership based off the criteria set by SECNAV M-5239.2. Figure 10 shows a statistical representation of the CSWF cadre (total of 3,886 individuals) for the whole command (first highlighted box in red) and actionable items that need attention by the ISSOs, CORs, and CSWF Team; the pie charts underneath offer a visual summary of the cadre's compliance, credential types, and SAs that require tracking as well.
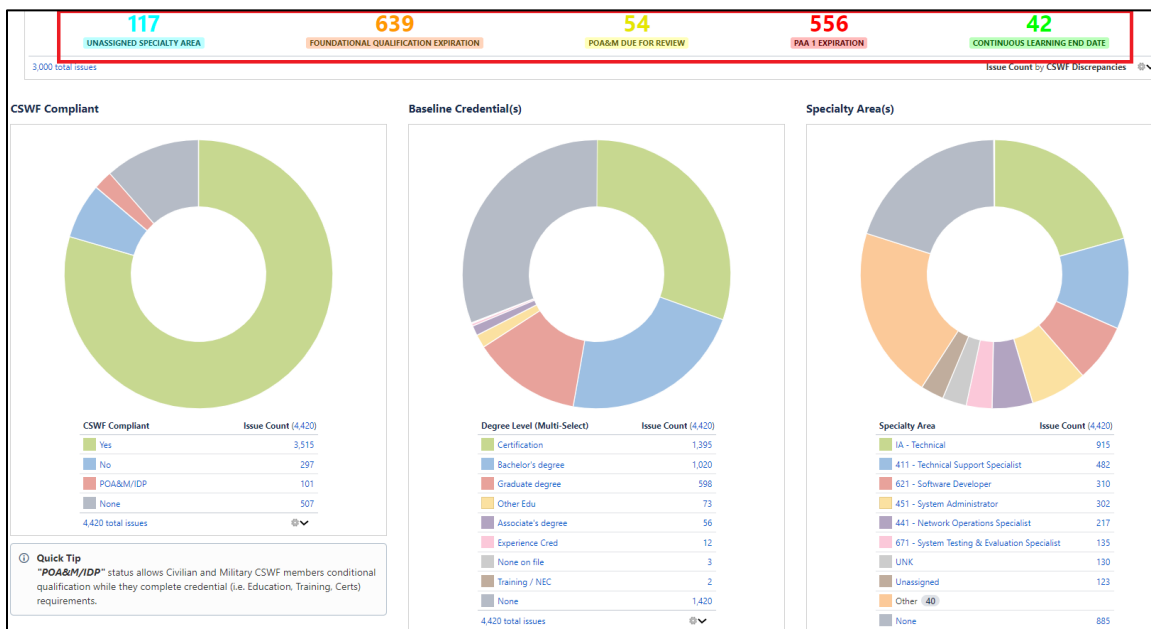

Figure 10.   CSWF Cadre Numbers in JRM. Source: Pendergrass (2022b).

The JRM requests at the command level are even more astounding. Within the last 30 days (as of 11 August 2022) there have been over 40,000 entries submitted and processed. Figure 11 bar graph illustrates the number of submittals in relation to their dates of submission just in July alone.
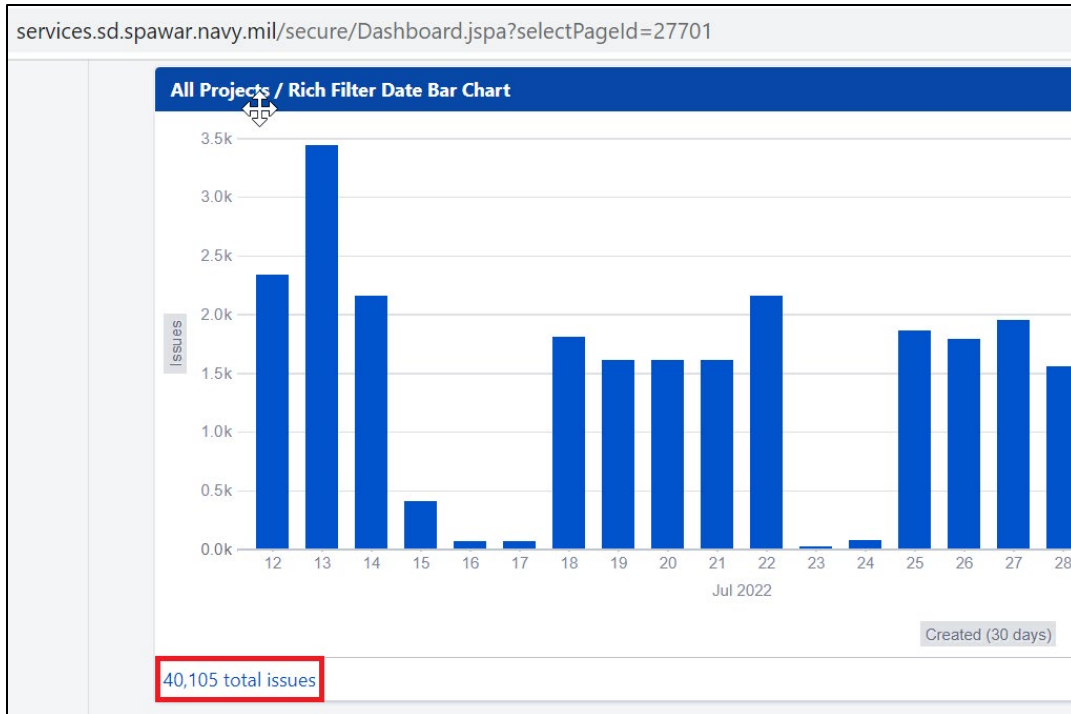
Figure 11. JRM Command Level Requests in The Last 30 Days. Source:
Pendergrass (2022b).

Lastly, there have been 853,647 items submitted for adjudication or processing by way of 168 separate projects (request types) being used on a daily basis as well. Figure 12 provides an insight as to the categories of submissions made by employees across NIWC PAC.
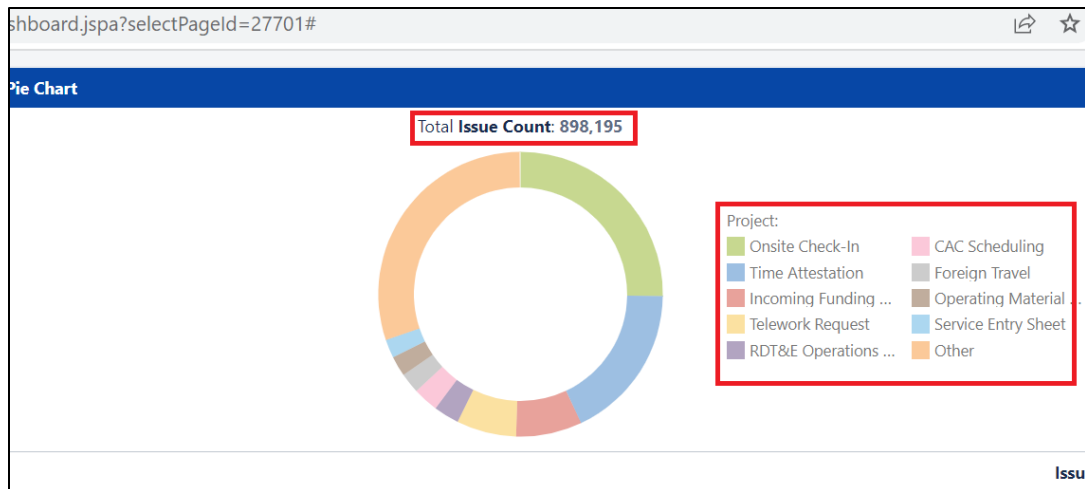
Figure 12. Total JRM Requests at Command Level. Source: Pendergrass (2022b).

B. SUMMARY

This chapter presented a qualitative and quantitative assessment to analyze the methodologies in place have effectively led to KM being shared and curated at the command, and that the command is successfully leveraging the KM platforms to conduct business practices by way of internal requests as well. The way JRM has been leveraged at the Center has been a force multiplier for stakeholders. At any moment stakeholders can check on request assignments, request status,' address discrepancies, and process times with ease to make improvements as their business requirements evolve. The sheer volume of both workflows, content, creation, and vetted business products being disseminated at the Center is a direct result of the unifying approach taken by leadership and participating teams to empower the workforce to be proactive and see the common goal that can be achieved once a vision has been set.

IV. CONCLUSIONS, RECOMMENDATIONS, SUMMARY, AND AREAS FOR FURTHER RESEARCH

A. CONCLUSIONS AND RECOMMENDATIONS

The results of this paper produced some conclusions about NIWC PACs KM efforts.

First, this research established that rigor in managing business products is a necessary function to ensure that they are reviewed and adjudicated holistically to ensure that they reflect the most relevant information. Scoping requirements at the onset of documenting and creating business products ensured that there would be minimal variation in the way actions would be conducted to ensure that only the expected and desired outcomes would be produced.

Secondly, the NIWC PAC KM team has created an environment where content can be easily shared to the user community in a uniform manner that is easy to digest and use. It also solidified the importance of rationalizing all content sharing efforts into one platform to establish consistency and repeatability when sharing information. This was done by the KM team establishing and proliferating expectations of how to create, manage, and share content in their chosen platform, Confluence. After trial and error, a succinct approach to sharing content was produced that makes it easy for the user community to find what they need and get back to business. Categorizing content by departments, function, service area and type has driven Center employees to the Hub in masse.

Thirdly, and probably one of the most important findings, was soliciting the participation of employees at the command in becoming Hub content managers. With bringing in employees to manage the content of their respective departments it broke down the siloed effect that once was prevalent at the command. Creating a CoP also ensured that content managers would have a venue to exchange ideas on how to better proliferate content/business products, or even find new functionalities to enhance the user experience as well.

An additional conclusion developed from this research was the importance of constantly collecting requirements. Either it be in the form of a best practice or user community feedback, the only way content relevancy and constant improvement prevails is by keeping a pulse of the user community and constantly solicit for areas of improvements.

Finally, KM efforts to move requests from emails to workflows in JRM has expedited the way departments and services areas receive and adjudicate requests. From travel, leave and time off, cellular device, or facility requests JRM proven its weight in gold. The visualization that can be produced in its dashboards allow leadership and other stakeholders the ability to make actionable decisions or remediate issues to better improve upon the way business is conducted or employee management as well. The DON is constantly looking for new ways to foster collaboration environments between Navy and Non-navy installations and commands, but it is vitally important that said entities segment their collaboration efforts from their repositories of authoritative information much like NIWC PAC has. The two cannot bleed into one another where items frequently being worked on are intermixed with finalized work products or it will create an environment where content and knowledge management is difficult to achieve or render it nonexistent altogether.

B. SUMMARY

This research provides an analysis of how NIWC created an effective organizational knowledge management structure. Its efforts in doing so has been compared to KM theories such as the SECI model and ECM. It also breaks down some key components in the CPI, content, and KM that has allowed NIWC PAC to thrive in an diverse environment as well.

C. AREAS FOR FURTHER RESEARCH

This research has brought one new phenomenon which deserves further investigation in the future.

The Navy is spearheading a new effort for commands to collaborate more among one another via a new initiative called Flank Speed through Microsoft Teams. It is easy to dive into a new platform such as this and leverage it as a one stop shop; but the effects of this effort warrants research on how commands will manage information within this platform. Especially since those commands and installations don't own the platform itself. NIWC PAC has demonstrated that KM is effective if an organization owns and manages the systems it uses and/or segments the use of collaboration environments from an internal authoritative one. This new dynamic that Flank Speed presents may create new challenges on how to create and manage knowledge since there will now be a dependency on an outside provider to create new solutions and solve potential issues as well.

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